### 11.3 Application and Theorems

1) A 6-foot-tall man is standing 50 feet from a flagpole. When he looks at the top of the flagpole, the angle of elevation is $39^{\circ}$. Find the height of the flagpole to the nearest foot.
2) A 14-foot ladder is being used to get to the top of a 12 -foot-tall wall. At what angle of elevation must the ladder be positioned in order to reach the top of the wall?
3) A plane is flying at an altitude of $12,000 \mathrm{~m}$. From the pilot, the angle of depression to the airport tower is $32^{\circ}$. How far is the tower from a point directly beneath the plane?

Name $\qquad$
Date $\qquad$ Period $\qquad$
2) A boy flies a kite with a 100 -foot-long string. The angle of elevation of the string is $48^{\circ}$. How high is the kite from the ground?
4) A mother gazes out a second-floor window at her son playing at the playground. If the mother's eye level is 12.6 meters off of level ground and the playground is 20 meters from the base of the building, what is the angle of depression from the mother's line of sight to the playground?
6) Burj Khalifa in Dubai is the tallest building in the world, standing at 828 meters. An adjacent building, 100 meters away, stands at 550 meters tall. What is the angle of depression from Burj Khalifa to the adjacent building?
7) When do sine and cosine equal the same amount?

Find the sine or cosine that is equivalent to what is given.
8) $\sin \left(12^{\circ}\right)$
9) $\cos \left(56^{\circ}\right)$
10) $\cos \left(64^{\circ}\right)$
11) $\sin \left(45^{\circ}\right)$
12) Write all forms of the Pythagorean identity.

Simplify the following trig expressions as much as possible using the basic identities.
13) $\frac{\sin ^{2} x}{1-\sin ^{2} x}$
14) $\frac{1-\cos ^{2} x}{1-\sin ^{2} x}$
15) $\frac{\cos ^{2} x}{1-\sin ^{2} x}$
16) $\cos ^{2} x-\sin ^{2} x \cos ^{2} x$
17) $\frac{1-\cos ^{2} x}{\tan ^{2} x}$

